

RESEARCH OF THE PHYSICAL AND MECHANICAL PROPERTIES OF
FIBERS OF DIFFERENT SELECTION VARIETIES

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Annotation: in this article, the physical mechanical properties of cotton fibers of different selection varieties were analyzed in the testing laboratory of the Department of "textile materials science", as well as by international standards, the quality of cotton fibers was evaluated using a microscope based on Özdst 604-2016 with methods of measurement in the classyor and TEXTECHNO system.

Keywords: electron microscope, fiber, spinning,

Калит сўзлар: электрон микроскоп, тола, йигириш, сифат

Ключевые слова: электронный микроскоп, волокно, прядение, качество quality

One of the main indicators of cotton fiber is the specific breaking strength and the length of the staple mass. If the length of the staple mass of cotton fiber decreases, the amount of short fibers increases, the strength and relative breaking strength decrease. As a result, the quality indicators of the yarns obtained from the fibers are negatively affected.

Even if the length of the fiber is reduced by 0.5 mm, the quality indicators of the threads obtained from it are observed to deteriorate. In addition, it causes an increase in the amount of waste during the spinning process.

In cotton ginning enterprises, the physical-mechanical and geometrical properties of the fiber change as a result of various factors, i.e. incorrect acceptance of cotton, long-term and high-density storage in the gin, drying at high temperature, cleaning and ginning, i.e. picking cotton from the fields, ginning, storage, drying, cleaning, ginning, fiber cleaning and pressing processes have a negative effect.

Changes in quality indicators of fibers according to different breeding varieties were studied in laboratory conditions.

Table 1
Physico-mechanical properties of different varieties of selection
change

т/р	Indicators	Selection varieties			
		Ko`paysin	Sulton	Guliston	Marvarid
1.	Linear density of fiber, mtex	171	181	178	194
2.	Fiber strength, sN	4,6	4,5	4,6	4,6

3.	Specific tensile strength of fiber, sN/tex	26,9	24,9	25,8	23,7
4.	Fiber length, mm including:				
	modal mass	30,5	30,1	30,8	30,8
	staple mass	33,8	33,0	34,5	32,9
	average	24,8	24,0	25,0	26,3

Based on the results of scientific research, figures 1 and 2 show graphs of fiber strength, specific breaking strength, and staple mass lengths from different selection varieties.

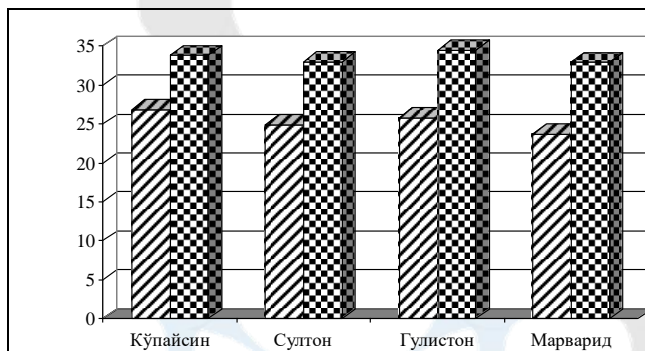


Figure 1. Variation of cotton fiber specific breaking strength and staple length by different selection varieties.

relative tensile strength; ▨
staple length ▣

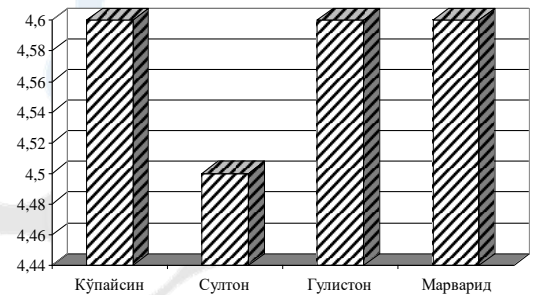


Figure 2. Different selection of cotton fiber tensile strength change in varieties.

If we compare the test results obtained from determining the physical and mechanical properties of cotton fiber, the tensile strength of Kopaysin selection grade cotton fiber is 4.6 sN, the specific tensile strength is 26.9 sN/tex, the length of the staple mass is 33.8 mm, Sultan The tensile strength of selected grade cotton fiber is 4.5 sN, the specific tensile strength is 24.9 sN/tex, the length of the staple mass is 33.0 mm, the tensile strength of Guliston selected grade cotton fiber is 4.6 sN, the specific tensile strength is 25, 8 sN/tex, the length of the staple mass was 34.5 mm, the breaking strength of cotton fiber of Marvarid selection grade was 4.6 sN, the relative breaking strength was 23.7 sN/tex, the length of the staple mass was 32.9 mm.

If we compare the results of the study with the parameters of Kopaysin selection grade fiber, the breaking strength of Су Селекция навлари fiber

decreased by 2.2%, the specific breaking strength decreased by 7.4%, the length of staple mass decreased by 2.2%, the breaking strength of Guliston selection grade cotton fiber did not change, the specific breaking strength decreased by 4.1%, the length of the staple mass increased by 2.1%, it was found that the breaking strength of cotton fiber of Marvarid selection variety did not change, the specific breaking strength decreased by 11.9%, the length of the staple mass decreased by 2.7%.

In addition, fiber quality indicators are studied based on the modern US TECHTECHNO system. Cotton fiber is divided into varieties according to color, appearance, ripeness and is sold in cotton exchanges based on these indicators.

Quality parameters of cotton fiber include linear density, specific breaking strength, color by variety, appearance, degree of yellowness, length, short fiber index and content of defects.

Another indicator of cotton fiber is its linear density. Measuring the linear density of a fiber with sufficient accuracy is more difficult. Therefore, the concept of linear density in the American fiber certification system was replaced by a micronaire indicator. In this method, it is determined by the loss of air flow passing through a group of parallel fibers. Air resistance is proportional to the fiber's cross-section, and the resistance of the fiber depends on its speed as a function of the cross-section.

The quality of cotton fiber was evaluated according to international standards according to UzDst 604-2016 by measuring methods using the classifier and TEXTECHNO system, and the obtained test results are presented in Table 2.

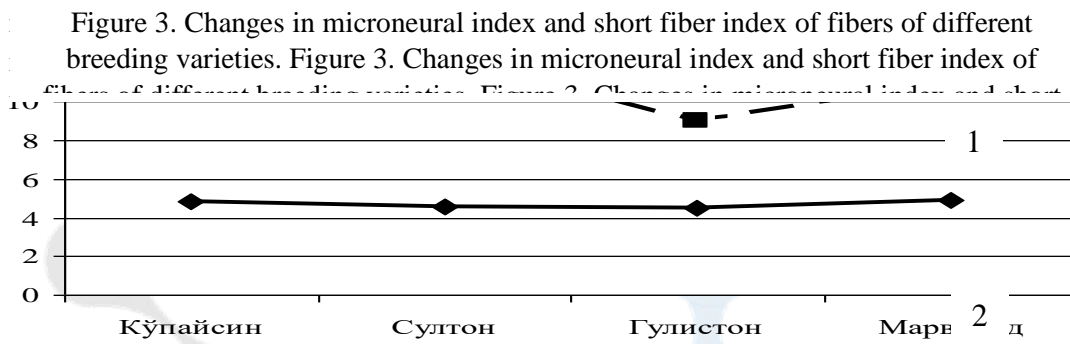
Table 2

Different selection varieties of cotton fiber quality indicators change according to

τ/p	Indicators	Selection varieties			
		Ko`paysin	Sulton	Guliston	Marvarid
1.	Mic-microneur	4,86	4,61	4,54	4,93
2.	Str-comparative breaking strength, gk/tex	26,69	28,16	31,60	27,62
3.	UHM-high average length	26,70	26,33	28,40	26,94
4.	Unf-length homogeneity, %	50,91	49,06	50,63	50,24
5.	SFI-short fiber index	11,15	12,05	9,02	10,93
6.	Emax-elongation at break, %	20,54	21,52	29,55	22,85
7.	Rd-ray reflection coefficient	63,50	71,43	68,98	63,00

8.	+b-degree of yellowness	8,30	8,48	8,25	8,40
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Based on the results in the table, figures 3-5 show the graphs of changes in fiber microneural index, specific breaking strength, high average length, short fiber index and degree of yellowness according to different selection varieties.



1-short fiber index;
2nd microneur indicator.

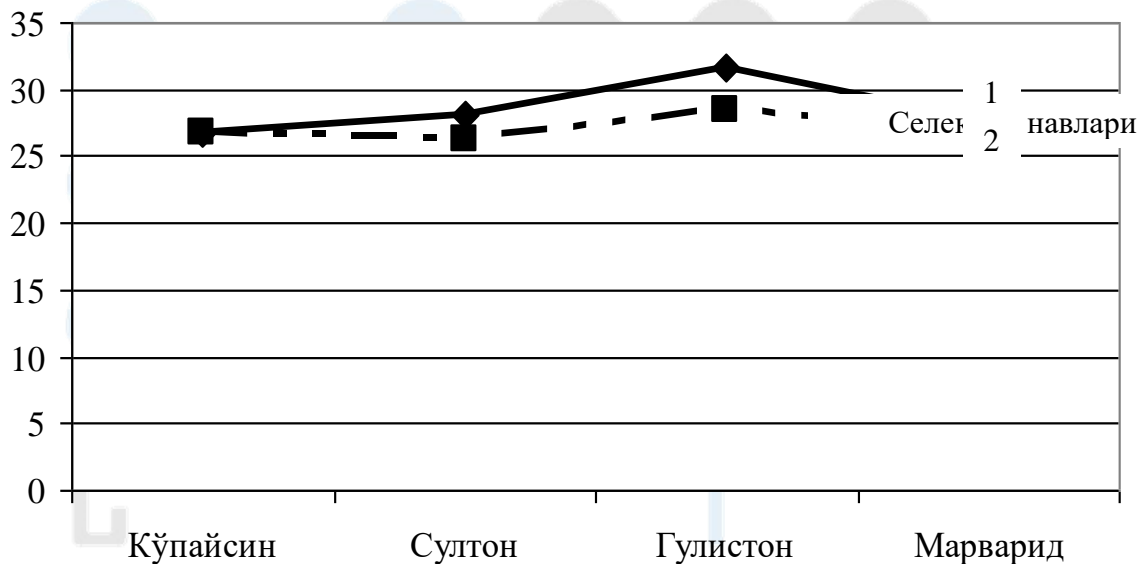


Figure 4. Changes in relative tensile strength and high average length of fibers of different breeding varieties.

1-comparative breaking strength;
2-high average length.

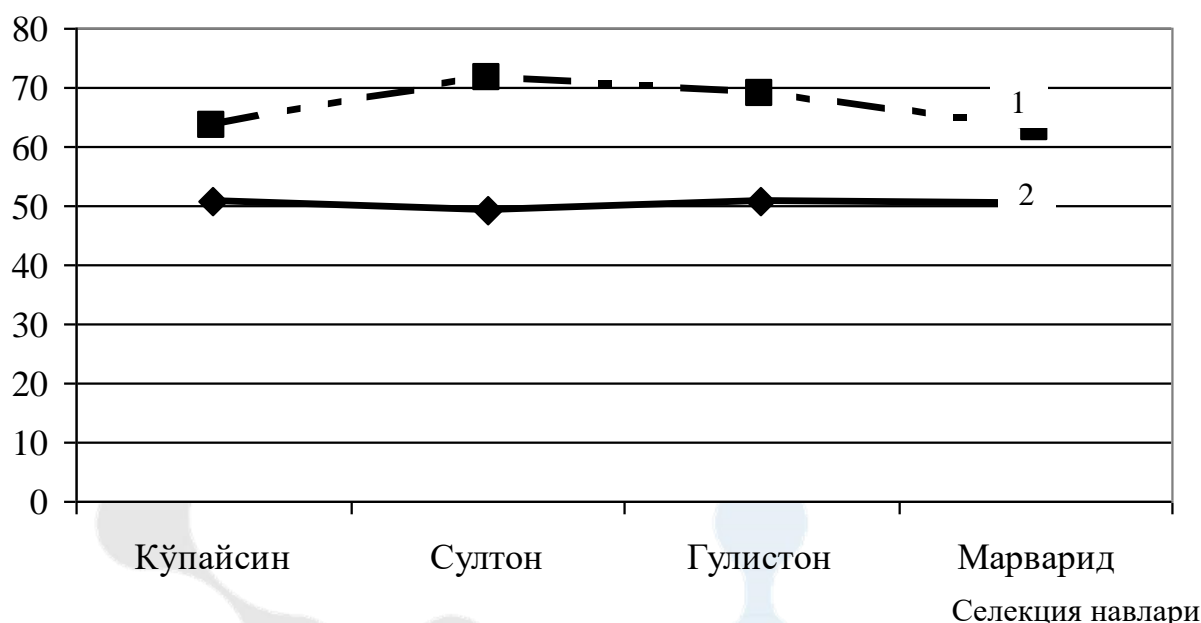


Figure 5. The uniformity of the length of the fibers of different breeding varieties and the change of the reflection coefficient.

1-ray reflection coefficient;

2-uniformity in length.

Analyzing the results of the study, the microneural index of Kopyasin selection fiber is 4.86, specific breaking strength is 26.69 gk/tex, high average length is 26.70, short fiber index is 11.15, elongation at break is 20.54 %, reflection coefficient 63.50 and degree of yellowness 8.3, microneur index of Sultan selection fiber 4.61, specific breaking strength 28.16 gk/tex, high average length 26.33, short fibers index is 12.05, elongation at break is 21.52%, reflection coefficient is 71.43 and degree of yellowness is 8.48, microneur index of Guliston selection grade fiber is 4.54, relative breaking strength is 31.60 gk/tex , high average length of 28.40, short fiber index of 9.02, elongation at break of 29.55%, reflection coefficient of 68.98 and yellowness level of 8.25, microneural index of Pearl selection fiber is 4.93 , a specific breaking strength of 27.62 gk/tex, a high average length of 26.94, a short fiber index of 63.00, an elongation at break of 22.85%, a reflectance of 63.00, and a yellowing degree of 8.40 organized.

The analysis of the results obtained in the determination of the quality indicators of the fiber showed that the relative tensile strength, high average length of the fiber was found to be higher in the cotton of Guliston selection variety compared to other selection varieties.

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